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Invention: SHREDDER WITH LOCK FOR ON/OFF SWITCH

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SPECIFICATION

SHREDDER WITH LOCK FOR ON/OFF SWITCH

Field of the Invention

[0001] The present invention relates to shredders for destroying articles, such as documents, CDs, floppy disks, etc.

Background of the Invention

[0002] Shredders are well known devices used for shredding items, such as documents, CDs, floppy disks, etc. With identity theft, there has been an increased consumer awareness of the desirability of shredding documents containing sensitive personal information, such as credit card bills, tax documents bearing a person's Social Security number etc.

[0003] Shredders contain a series of cutting elements for shredding articles fed therein. Generally, it is desirable to prevent the inadvertent actuation of the motor driving the cutter elements. To this end, the present invention endeavors to provide a construction that has a reduced chance of being inadvertently actuated.

Summary of the Invention

[0004] One aspect of the present invention provides a shredder with a switch lock that locks the on/off switch in its off position. Specifically, the shredder comprises a shredder mechanism including an electrically powered motor and cutter elements. The shredder mechanism enables articles to be shredded to be fed into the cutter elements. The motor is operable to drive the cutter elements so that the cutter elements shred the articles therein. The on/off switch is electrically coupled to the motor of the shredder mechanism. The switch includes a manually engageable portion manually movable by a user's hand between at least (a) an on position wherein the switch enables delivery of electric power to the motor, and (b) an off position disabling the delivery of electric power to the motor. The switch lock is movable between (a) a locking position wherein the switch is locked in the off position, and (b) a releasing position wherein the switch is released for movement from the off position.

[0005] Other objects, features, and advantages will become appreciated from the following detailed description, the accompanying drawings, and the appended claims.

Brief Description of the Drawings

[0006] Figure 1 is a perspective view of a shredder seated atop a container with a switch lock thereof in a locking position;

[0007] Figure 1A is a perspective exploded view of the shredder of Figure 1;

[0008] Figure 2 is a perspective view of the shredder of Figure without the container and with the switch lock in the releasing position thereof;

[0009] Figure 3 is a top plan view of the shredder of Figure 1 without the container and with the switch lock in the locking position;

[0010] Figure 4A is a top plan view showing the switch lock, an on/off switch of the shredder in isolation from the remainder of the shredder with the switch lock in the locking position;

[0011] Figure 4B is a view similar to Figure 4A, but with the switch lock in the releasing position;

[0012] Figure 5 is a bottom perspective view of the shredder of Figure 1 with the shredder unit mechanism removed and the switch lock in the releasing position;

[0013] Figure 6 is a view similar to Figure 5 with the switch lock in the locking position;

[0014] Figure 7 is a perspective view of an alternative embodiment of a shredder with the container omitted, wherein the switch lock and throat cover move together, with the switch lock in the releasing position and the throat cover in the open position;

[0015] Figure 8 is a perspective view similar to Figure 7, but with the switch lock in the locking position and the throat cover in the closed position;

[0016] Figure 9 is a top plan view of the shredder of Figure 7 with the switch lock in the releasing position and the throat cover in the open position;

[0017] Figure 10 is a top plan view similar to Figure 9, but with the switch lock in the locking position and the throat cover in the closed position;

[0018] Figure 11A is a vertical cross-section taken through the front to back centerline of the shredder of Figure 7 with the shredder mechanism removed and with the switch lock in the locking position and the throat cover in the closed position;

[0019] Figure 11B is a view similar to Figure 11A, but with the switch lock in the releasing position and the throat cover in the open position;

[0020] Figure 12A is a top plan view showing the switch lock, the on/off switch of the shredder, a switch lock indicator and an indicator window of the shredder housing in isolation from the remainder of the shredder with the switch lock in the locking position;

[0021] Figure 12B is a view similar to Figure 12A, but with the switch lock in the releasing position; and

[0022] Figure 13 is a perspective view of a shaft with a plurality of cutter elements.

Detailed Description of the Illustrated Embodiment(s) of the Invention

[0023] Figures 1-6 illustrate an embodiment of a shredder constructed in accordance with one embodiment of the present invention. The shredder is generally indicated at 10. The shredder 10 sits atop a waste container, generally indicated at 12. The shredder 10 illustrated is designed specifically for use with the container 12, as the shredder housing 14 sits on the upper periphery of the waste container 12 in a nested relation. However, the shredder 10 may be of the type provided with an adaptable mount for attachment to a wide variety of containers. Generally speaking, the shredder 10 may have any suitable construction or configuration and the illustrated embodiment is not intended to be limiting in any way.

[0024] The shredder 10 includes a shredder mechanism 16 including an electrically powered motor 18 and a plurality of cutter elements 20. The cutter elements 20 are mounted on a pair of parallel rotating shafts 22 in any suitable manner, and an example of a shaft 22 with cutter elements 20 is illustrated in Figure 13. The motor 18 operates using electrical power to rotatably drive the shafts 22 and the cutter elements 20 through a conventional transmission 23 so that the cutter elements 20 shred articles fed therein. The shredder mechanism 16 also may include a sub-frame 21 for mounting the shafts 22, the motor 18, and the transmission 23. The operation and construction of such a shredder mechanism 16 are well known and need not be described herein in detail. Generally, any suitable shredder mechanism 16 known in the art or developed hereafter may be used.

[0025] The shredder 10 also includes the shredder housing 14, mentioned above. The shredder housing 14 includes top wall 24 that sits atop the container 12. The top wall 14 is molded from plastic and has an opening 26 near the front thereof, which is formed in part by a downwardly depending generally U-shaped member 28. The opening 26 allows waste to be discarded into the container 12 without being passed through the shredder mechanism 16, and the member 28 may act as a handle for carrying the shredder 10 separate from the container 12. As an optional feature, this opening 26 may be provided with a lid, such as a pivoting lid, that opens and closes the opening 26. However, this opening in general is optional and may be omitted entirely. Moreover, the shredder housing 14 and its top wall 24 may have any suitable construction or configuration.

[0026] The shredder housing 14 also includes a bottom receptacle 30 having a bottom wall, four side walls, and an open top. The shredder mechanism 16 is received therein, and the receptacle 30 is affixed to the underside of the top wall 24 by fasteners 32 inserted through bores in posts 34 on the receptacle 30 and engaged with corresponding bores in posts 35 (see Figures 5 and 6). The receptacle 30 has a downwardly facing opening 31 for permitting shredded articles to be discharged from the shredder mechanism 16 into the container 12.

[0027] The top wall 24 has a generally laterally extending opening 36 extending generally parallel and above the cutter elements 20. The opening 36, often referred to as a throat, enables the articles being shredded to be fed into the cutter elements 20. As can be appreciated, the opening 36 is relatively narrow, which is desirable for preventing overly thick items, such as large stacks of documents, from being fed into cutter elements 20, which could lead to jamming. The opening 36 may have any configuration.

[0028] The top wall 24 also has a switch recess 38 with an opening 40 therethrough. An on/off switch 42 includes a switch module 44 (Figs. 4A-6) mounted to the top wall 24 underneath the recess 38 by fasteners 45, and a manually engageable portion 46 that moves laterally within the recess 38. The switch module 44 has a movable element 48 that connects to the manually engageable portion 46 through the opening 40. This enables movement of the manually engageable portion 46 to move the switch module between its states.

[0029] In the illustrated embodiment, the switch module 44 connects the motor 18 to the power supply (not shown). Typically, the power supply will be a standard power cord 47 with a plug 49 on its end that plugs into a standard AC outlet, but any suitable manner of power delivery may be used. The switch 42 is movable between an on position and an off position by moving the portion 46 laterally within the recess 38. In the on position, contacts in the switch module 44 are closed by movement of the manually engageable portion 46 and the movable element 48 to enable a delivery of electrical power to the motor 18. In the off position, contacts in the switch module 44 are opened to disable the delivery of electric power to the motor 18.

[0030] As an option, the switch 42 may also have a reverse position wherein contacts are closed to enable delivery of electrical power to operate the motor 18 in a reverse manner. This would be done by using a reversible motor and applying a current that is of a reverse polarity relative to the on position. The capability to operate the motor 18 in a reversing manner is desirable to move the cutter elements 20 in a reversing direction for clearing jams. In the illustrated embodiment, in the off position the manually engageable portion 46 and the movable element 48 would be located generally in the center of the recess 38, and the on and reverse positions would be on opposing lateral sides of the off position.

[0031] Generally, the construction and operation of the switch 42 for controlling the motor 42 are well known and any construction for such a switch 42 may be used.

[0032] The top cover 24 also includes another recess 50 associated with a switch lock 52. The switch lock 52 includes a manually engageable portion 54 that is movable by a user's hand and a locking portion 56 (Figs. 4A-6). The manually engageable portion 54 is seated in the recess 50 and the locking portion 56 is located beneath the top wall 24. The locking portion 56 is illustrated as being integrally formed as a plastic piece with the manually engageable portion 54 and extends beneath the top wall 24 via an opening 58 formed in the recess 50.

[0033] The recess 50 also has a pair of slots 60 on the opposing lateral sides thereof. The manually engageable portion 54 has resilient catch members 62 with flared ends that are inserted into these slots 60 so as to securely mount the switch lock 52 for sliding movement within the recess 50.

[0034] The switch module 44 is mounted so as to define a small space between it and the underside of the top wall 24. The movable element 48 of the switch 42 extends through this space. The locking portion 56 of the switch lock 52 has a switch receiving recess 64 with a pair of angled camming surfaces 66, 68 on opposing sides thereof. This construction causes the switch 42 to move from either its on position or reverse position to its off position as the switch lock 52 is moved from a releasing position to a locking position. In the releasing position, the locking portion 56 is disengaged from the movable element 48 of the switch 42, thus enabling the switch 42 to be moved between its on, off, and reverse positions. In the locking position, the switch lock 52 extends into the space between the module 44 and the top wall 24 so that the movable element 48 is received in its off position in the recess 64 and restrained against movement to either its on or reverse position.

[0035] The camming surfaces 66, 68 are provided to move the switch 42 to its off position as the switch lock 52 is moved from its releasing position to its locking position. Specifically, when the switch 42 is in the on position, cam surface 66 will engage the movable element 48 of the switch 42 and cam the same so as to move the switch 42 into the off position with the movable element 48 thereafter restrained against movement from its off position. Likewise, when the switch 42 is in the reverse position, cam surface 68 will engage the movable element 48 and cam the same so as to move the switch 42 to the off position with the movable element 48 thereafter restrained from movement from its off position. Figs. 4A-6 best illustrate these features of this embodiment of the invention.

[0036] In embodiments where the switch 42 has no reverse position, the corresponding cam surface 68 may be omitted. Also, the switch lock 52 may be constructed to move the switch

42 from the on and/or reverse position to the off position as the switch lock 52 moves from the releasing position to the locking position by any suitable arrangement, and the cam surface(s) are not intended to be limiting. For example, mechanical links or other structures may be used. Moreover, it is not necessary to have the switch lock 52 move the switch 42 into its off position. Instead, the switch lock 52 could be constructed so that the switch 42 is manually moved to its off position prior to moving the switch lock 52 to its locking position.

[0037] Preferably, but not necessarily, the manually engageable portion 54 of the switch lock 52 has an upwardly extending projection 70 for facilitating movement of the switch lock 56 between the locking and releasing positions.

[0038] One advantage of the switch lock 52 is that, by holding the switch 42 in the off position, to activate the shredder mechanism 16 the switch lock 52 must first be moved to its releasing position, and then the switch 42 is moved to its on or reverse position. This reduces the likelihood of the shredder mechanism 16 being activated unintentionally.

[0039] Figs. 7-11B illustrate another embodiment of a shredder 100. This shredder 100 shares many common features with the shredder 10 of the first embodiment, and those common features are marked with the same reference numerals.

[0040] The primary difference between shredder 10 and shredder 100 is the cover 102. The cover 102 is seated within a recess 103 formed in the top wall 24 and can move between open and closed positions. In the closed position, the cover 102 covers the opening 36 to prevent articles from being fed into the housing 14 and into the cutter elements 20. In the open position, the cover 102 uncovers the opening 36 to allow the articles to be shredded to be fed into the housing 14 and into the cutter elements 20. Specifically, the cover 102 has an opening 104 shaped similarly to opening 36. In the open position, these openings 36, 104 are aligned to enable feeding of articles through the openings 36, 104 and into the cutter elements 20. In the closed position, these openings 36, 104 are out of alignment, thus preventing such feeding of articles into the cutter elements 20.

[0041] In this embodiment, switch lock 52 is integrated as a molded part with the cover 102. Basically, the manually engageable portion 54 illustrated in the previous embodiment is eliminated and the locking portion 56 is formed integrally with the cover 102 (see Figs. 11A and 11B). As a result, the cover 102 and the switch lock (i.e., locking portion 56) move together between (a) the open position of the cover 102 and the releasing position of the switch lock 52, and (b) the closed position of the cover 102 and the locking position of the switch lock 52.

[0042] As a result of this construction, if the switch 42 is left in the on or reverse position, the user can simply move the cover 102 to its closed position to simultaneously close

the opening 36 and move the switch 42 to its off position by the camming action of locking portion 56 moving to its locking position. Of course, if the locking portion 56 is of the type where it does not move the switch 42 to its off position as during movement to the locking position, then the user would first move the switch 42 to its off position. In either case, to use the shredder, the user first moves the cover 102 to its open position, which simultaneously moves the locking portion 56 to its releasing position. Then, the switch 42 can be moved to the on position (or the reverse position if needed).

[0043] The switch lock 52 and the cover 102 need not be linked by being integrally formed together as one piece, and they could be formed separately and linked together for movement in any suitable way. Also, the cover 102 could be independent from the switch lock 52, with the same type of switch lock being used as is used in the first embodiment.

[0044] The cover 102 also has an upwardly extending ridge 114 for facilitating movement of the cover 102 and the switch lock 52.

[0045] In the second embodiment illustrated, the top wall 24 also has an indicator window 106. The window 106 may simply be an opening 106, or it may have a transparent/translucent member therein. An arm 108 is formed integrally with the locking portion 56 and extends therefrom. The end of the arm 108 carries a locked indicator 110 and an unlocked indicator 112. The locked indicator 110 has the appearance of a locked padlock, and the unlocked indicator 112 has the appearance of an unlocked padlock. When the cover 102 is in the closed position and the switch lock 52 provided by locking portion 56 is in the locking position, the locked indicator 110 is located beneath the indicator window 106, enabling the user to visually see the locked indicator 100 and tell that the on/off switch 42 is locked in the off position (Fig. 12A). Likewise, when the cover 102 is in the open position and the switch lock 52 is in the releasing position, the unlocked indicator 112 is positioned beneath the window 106, enabling the user to visually see the unlocked indicator 112 and tell that the on/off switch 42 is freely movable (Fig. 12B).

[0046] Generally, this construction may be considered as providing a status indicator that visually indicates to the user whether the switch lock 52 is in the locking position. As one variation, the unlocked indicator 112 could be eliminated, providing only the locked indicator 110 to indicate that the switch lock 52 is in its locked position, with the locked indicator's absence in the window 106 indicating that switch lock 52 is in its releasing position. As another variation, one or more LEDs or other type of light may be used to indicate whether the switch lock 52 is in the locking position. Any other suitable device may be used to indicate the status of the switch lock and the examples herein should not be considered limiting.

[0047] The foregoing embodiments have been provided solely for the purposes of illustrating the structural and functional principles of the present invention, and should not be considered limiting. To the contrary, the present invention is intended to encompass all variations, modifications, and alterations within the spirit and scope of the appended claims.